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Date

Fry Heath & Spence LLP

4 September 2002

12. Name and daytime telephone number of person to contact in the United Kingdom A.V. Fry - 01293 776880

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FLUID DISPENSER

This invention relates to dispensers for applying a flowable material to a surface such as, for example, a skin surface.

In one aspect, the invention relates to deformable dispensers of reservoir shaving brushes. A reservoir shaving brush is one in which the brush handle serves as a container for liquid soap to be fed to the brush bristles. In another aspect, the invention relates to deformable dispensers for feeding flowable materials such as liquid gels or balms to a skin surface.

My British Patent Application 2319464A discloses a reservoir shaving brush having a brush head releasably attached to a plastics dispenser in the form of a bellows. In use, the bellows is designed to be compressed by hand to cause liquid soap to flow to the brush bristles and thence to the skin of the user.

When seeking to manufacture a reservoir shaving brush as disclosed in my earlier Application, considerable difficulties were encountered in selecting for the bellows an extrudable thermoplastics material having the physical properties necessary to achieve the seemingly contradictory characteristics of sufficient flexibility and lightness for ease of operation and handlibility of the bellows, and sufficient rigidity of the bellows itself when not in use and sufficient stability for it to be secured to a brush head. Many of the multiplicity of different thermoplastics materials considered met the flexibility criterion but either lacked the rigidity or stability requirements when produced in a gauge which satisfied the weight criterion.

Considerable efforts were also required to determine for any given dispenser size an average wall thickness which would enable a relative low

~~weight for the dispenser to be achieved without consequent loss of the physical properties necessary for satisfactory operation of the dispenser.~~

One object of the present invention is, therefore, to provide a deformable dispenser which meets the requirements stated above; another object is to provide a dispenser for a reservoir shaving brush which does not suffer from, or at least alleviates, many of the disadvantages present in previous proposals for such brushes.

According to the present invention in one aspect, there is provided a fluid dispenser extruded from a low density polyethylene material and moulded under pressure to form a body comprising a bellows closed at one end and including at its other end an upstanding open-ended neck portion formed with external screw threads, the bellows comprising a plurality of vertically spaced ring-shaped outer fold-lines, a plurality of vertically spaced inner ring-shaped fold-lines of smaller diameter than that of the outer fold-lines and each positioned at a height generally midway between each pair of outer fold-lines, and annular webs extending between neighbouring inner and outer fold-lines, and wherein the mean thickness of the webs is between 0.4 and 1.50mm, the height of the dispenser is between 55 and 85mm and the weight of the dispenser is between 10 and 17.5 grams.

By "low density polyethylene" is meant a polyethylene in which some of the chain of carbon atoms have long chains of polyethylene attached to them.

In a preferred arrangement, the mean thickness of the webs is between 0.5 and 1.25mm.

The mean thickness at the outer fold-lines is preferably between 0.25 and 0.85mm.

The mean thickness at the inner fold-lines is preferably between 0.70

and 1.50mm.

Preferably, the ratio of thicknesses of the inner and outer fold-lines falls within the range 1.5:1 and 2.5:1

Applicant has established that by ensuring that the thickness of the outer fold-lines is less than that of the inner fold-lines, the bellows is enabled to collapse more readily when subjected to hand pressure. Also, the increased thickness of the inner fold-lines provides for the bellows the required resilience which enables it to return to its original size once hand pressure is released.

The upper open end of the neck of the bellows may be closed by a cap formed with internal screw threads. An open-ended narrow-bored tube may be provided within the cap to enable flowable material contained in the bellows to flow to an applicator mounted on or forming part of the cap.

In another aspect, the invention provides a reservoir shaving brush which comprises a dispenser for shaving cream including a bellows for containing a quantity of shaving cream from which is upstanding a neck closed by a cap on which is mounted a brush head comprising a plurality of brush bristles retained within a ferrule by means of an adhesive, an open-ended narrow-bored tube upstanding from the base of a recess formed in the cap and dimensioned to receive the ferrule of the brush head, the tube extending through the ferrule to a height at or just above the upper surface of the ferrule to enable shaving foam to flow from the bellows to the brush bristles when the bellows is depressed by the user.

The invention will now be described by way of example only, with reference to the accompanying diagrammatic drawings in which:-

Figure 1 is a section taken through a bellows of a dispenser in accordance with the invention;

Figure 2 is a side view of the bellows shown in Figure 1;

Figure 3 is a section taken through a cap which forms part of a dispenser in accordance with the invention;

Figure 4 is a plan view of the cap shown in Figure 3;

Figure 5 is a side view of a brush head of the illustrated dispenser;

Figure 6 is a side view of a reservoir shaving brush in accordance with the invention;

Figure 7 is an exploded side view of an alternative dispenser in accordance with the invention;

Figure 8 is a plan view of the dispenser shown in Figure 6;

Figure 9 is a side view of the dispenser illustrated in Figures 7 and 8;

Figure 10 is a plan view of a support forming part of the dispenser shown in Figure 7; and

Figures 11 and 12 are respectively side and upper plan views of an overcap for the previously illustrated reservoir shaving brush.

The dispenser bellows illustrated in Figures 1 and 2 is produced from extruded low density polyethylene. The bellows is closed at its base 1 and is formed at its upper end with an upstanding neck 2. The neck has screw threads 3 around its outer circumference. The bellows comprises a plurality of vertically spaced ring-shaped outer fold-lines 4, a plurality of vertically spaced ring-shaped inner fold-lines 5 and a plurality of inclined webs 6 extending between the inner and outer fold-lines.

The bellows is produced by extruding an annulus of low density plastics of a predetermined thickness into a two-part pressure mould whose internal shape complements the external shape required for the bellows, clamping the mould parts together and introducing a gas under pressure into the mould interior to cause the extruded plastics to adopt the internal shape of the mould. The mould parts are then separated and the formed bellows ejected.

Trials have shown the importance of ensuring that the moulded bellows conforms to predetermined physical criteria. Thus, the average thickness of the webs 6 must be between 0.4 and 1.50mm and the average thickness of the fold-lines 4 must be between 0.25 and 0.85mm. For satisfactory performance and handliability characteristics, it has also been established that the bellows height must be between 55 and 85mm and the bellows weight between 10 and 17.6 grams.

The neck 2 of the bellows is closed by an internally threaded cap 7 as shown in Figures 3 and 4. This cap has an upper surface 8 formed with a well 9 having a base 10 from which upstands a narrow bored tube 11. The height of the tube is such that its upper tip protrudes a small distance above the upper surface 8. Typically this height is between 2 and 5mm.

The underside of the cap includes an annular recess 12 into which is received the upper end portion of the neck 2 of the bellows. Threads 13 are positioned within the recess which complement the threads 3 of the neck 2. A skirt 14 extends downwardly from the boundary of the upper surface 8 of the cap.

The diameter of the tube 11 is typically 1.0 to 4.0mm and is sufficient to ensure a steady flow of shaving cream through the tube when the bellows is depressed. If the tube diameter is less than 1.0mm, the flow of shaving cream through the tube tends to be inhibited. If greater than 4.0mm, fewer than desirable brush bristles are possible.

The well 9 is dimensioned to receive a ferrule 15 of a brush head of the reservoir shaving brush illustrated in Figure 5. The ferrule is formed with a through-hole through which the tube 11 can pass to a position in which the tube tip is located within the lower ends of the bristles. The bristles 16 of the brush head are secured within the ferrule 15 by adhesive. When solidified, the adhesive firmly retains the bristles in position. A hole is then drilled into the solidified adhesive to receive the tube 11. The height of the tube is sufficient to ensure that shaving cream flows from the bellows directly into the mass of brush bristles. Ideally there is a low resilience interference fit between the tube and the drilled hole to ensure only upward flow of the shaving cream into the bristles. The hole through the adhesive must be continuous and the upper tip of the tube typically projects between 2 and 5mm above the upper surface of the cap 7. The height of the tube is preferably, but not necessarily, above the upper surface of the cap. If it is above the surface of the cap it is preferable that the tube does not extend more than 2 to 5mm and in any event no more than 12.5mm into the bristles to avoid the tube from coming into contact with the user's skin. Ideally the height of the tube will be between 5mm and 27.5mm. The ferrule 15 carries external screw-threads 17, which cooperate with screw-threads 18 of the cap 7.

The assembled reservoir shaving brush is shown in Figure 6.

The recess 12 in the cap is dimensioned to receive the ferrule 15 and is nominally 21mm in diameter and nominally 12mm deep. These are the preferred dimensions. The base of the brush bristles is also nominally 21mm in diameter and packed to a density such that the base dimension is more or less solid at 21mm, at the point at which the bristles are secured in the adhesive. The brush flares out at the top to around 35mm in diameter where the brush bristles are no longer compressed. The 21mm measurements for the ferrule and brush base diameters could operate in the range between 15mm and 27mm; this would give a range of between 25mm and 45mm at the flared end of the brush. The 12mm depth of the recess is more or less

ideal but could operate between, say, 5mm and 25mm.

The recessed base acts both as a plug locatable in the bellows neck which is formed with a narrow outlet for receiving the tube through which shaving cream is directed to the brush head; and as a carrier into which the brush ferrule can be secured. The purpose of the tube is to direct the flow of shaving cream to a point within the bristles. This removes any likelihood of the shaving cream finding its way round the outside of the ferrule or screw threads of the cap. Effectively, the point of upward pressure of the shaving cream is transferred to a point of low resistance close to the base of the brush bristles. If the cap of Figure 3 did not have a base 10 and tube 11 and the neck was fully open to the base of the ferrule then the upward pressure of shaving cream would try to force the ferrule from the cap. Alternatively, shaving cream may be forced round the outside of the ferrule.

In the embodiment illustrated in Figures 7 to 9, the brush head is replaced by an applicator in the form of an absorbent pad 21 produced, for example, from a sponge material. In this embodiment (in which the same reference numerals have been used for the same integers shown in Figure 1 to 6), a quantity of flowable material such as a skin-care balm or gel is provided in the bellows and is applied to the skin via the sponge applicator 21.

As will be seen from Figure 7, the neck 2 of the bellows carries external screw-threads 3 which cooperate with internal threads 26 of a ring shaped cap 22. Retained between the cap 22 and the bellows is a dome-shaped sponge support 23 and the absorbent pad 21. The domed support includes a centrally positioned and bordering opening 29 (see Figure 10). On assembly, the pad 21 takes up the domed configuration of the support 23 and protrudes through the central opening 24 of the cap 22. The opening 24 can be seen from Figure 8 of the drawings. An assembled dispenser covered by a removable overcap 25 is shown in Figure 9.

The thickness of the pad 21 should be sufficient whereby pressure applied to the pad to cause the contents of the bellows to reach the skin should not allow the skin to come into contact with the cap 22 or other plastic parts of the dispenser. Ideally the pad will be an open celled material such as a synthetic or natural sponge. The preferred thickness of the pad will be around 15mm and ideally between 5mm and 25mm. The preferred diameter of the pad will be around 45mm and ideally between 25mm and 65mm.

The pad 21 can be retained between the cap 22 and the domed support 23 by trapping the sponge between the flange of the cap 22 and the outer shoulders of the domed support 23. Alternatively, the pad 21 can be secured to domed support 23 by an adhesive, care being taken not to block the holes 29 through which flowable materials must pass.

An overcap 27 for the illustrated reservoir shaving brush is shown. in Figures 11 and 12. The internal circumference of the open end of the overcap 27 defines an interference fit with the skirt 14 of the cap 7. Alternatively, these parts could also be secured by an internal threaded section of the overcap with a threaded section on the skirt of the cap.

The overcap 27 has holes 28 in its top instead of the multiplicity of holes illustrated. A single hole of increased diameter could be provided. As shown there are nine holes of 2mm diameter present in the top of the overcap. The holes enable the brush to breath and dry out by evaporation when the overcap is placed over a wet brush.

It will be appreciated that the foregoing is merely exemplary of dispensing apparatus in accordance with the invention and that various modifications can readily be made thereto without departing from the true scope of the invention.

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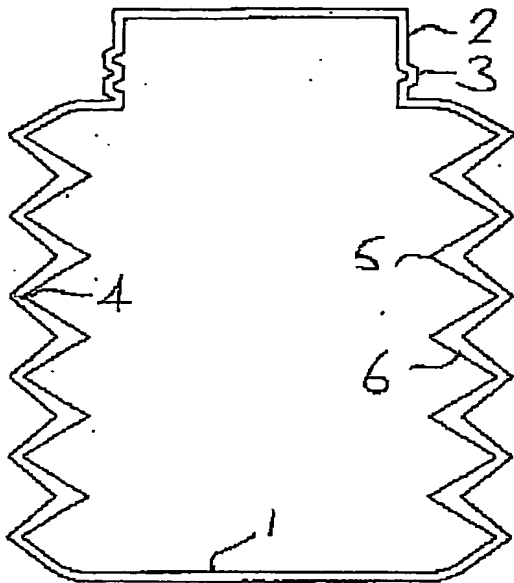


FIG. 1

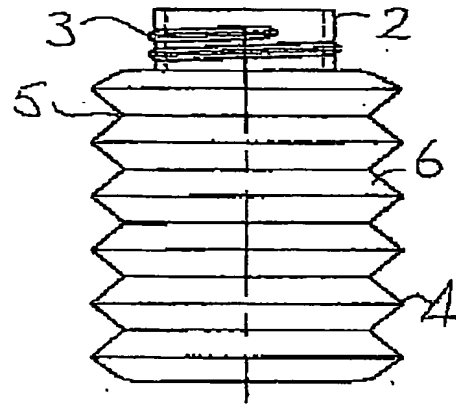


FIG. 2



FIG. 3

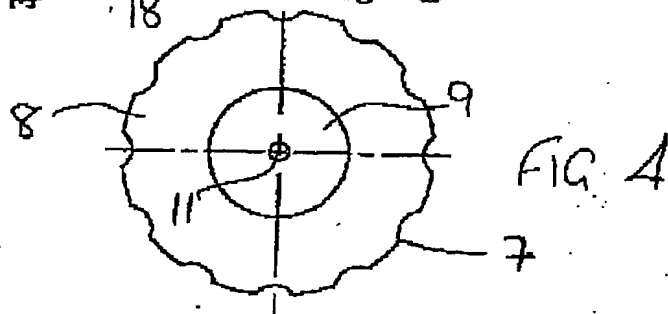


FIG. 4

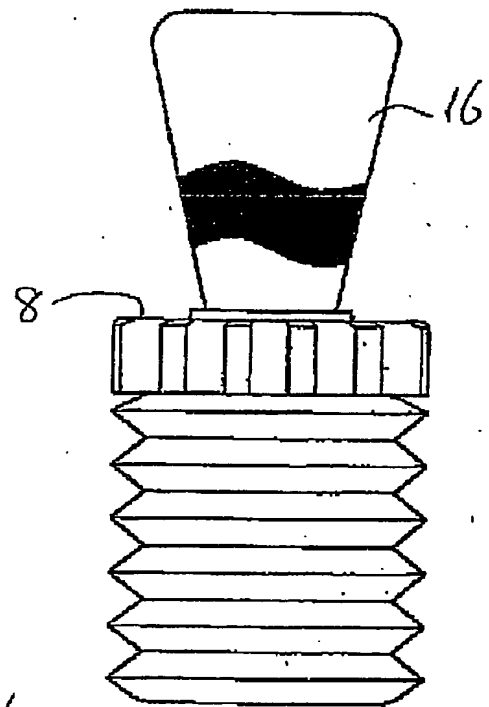


FIG. 5

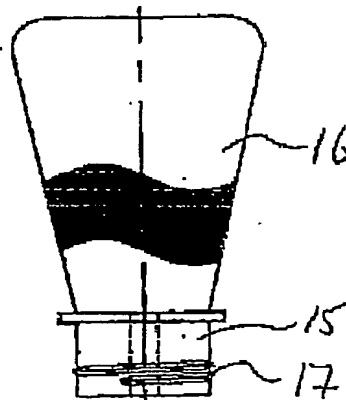


FIG. 6

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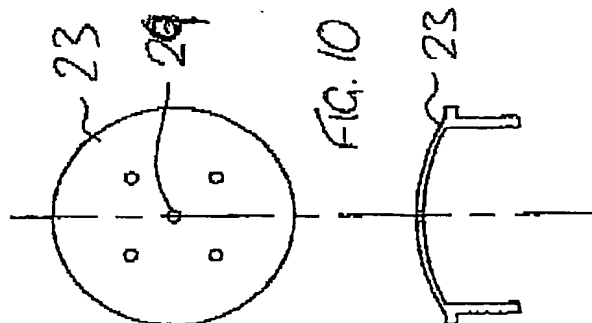
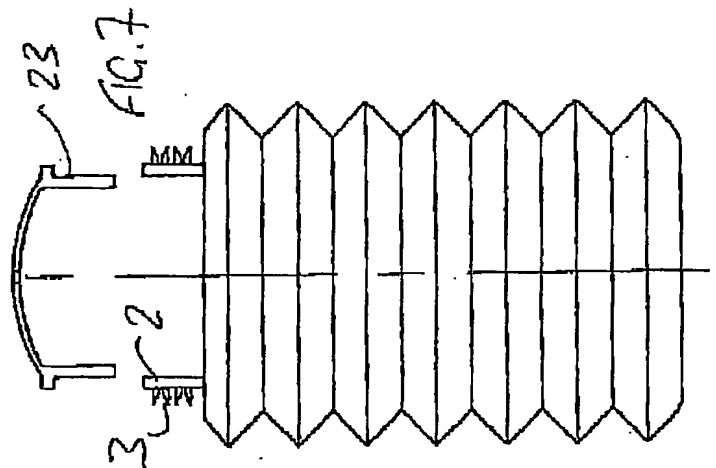
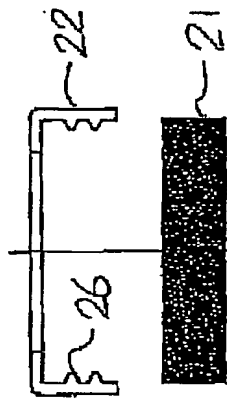
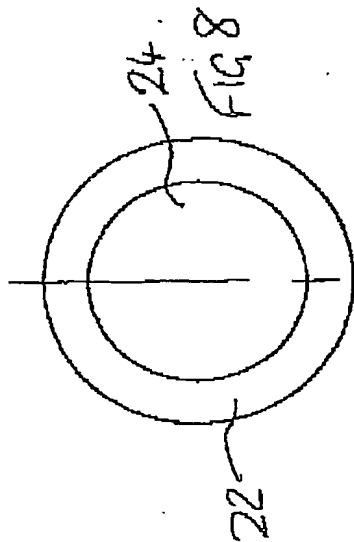
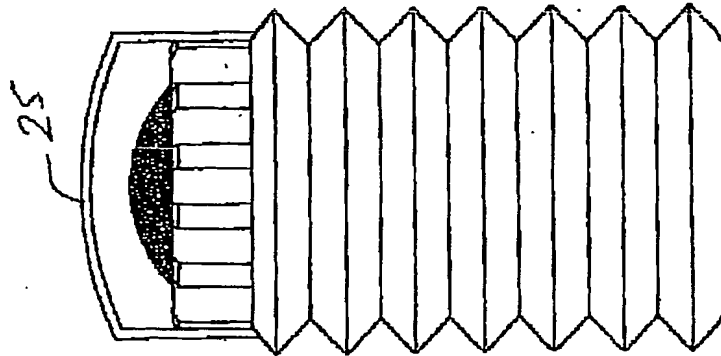


FIG. 9



3/3

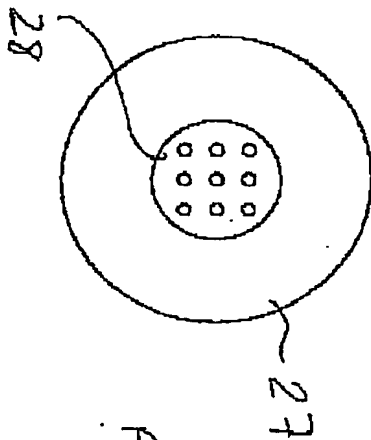


FIG 12

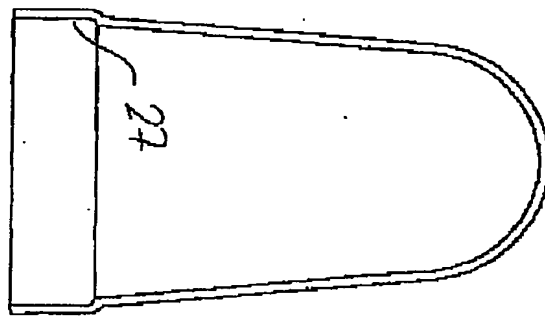


FIG 11

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